
RST-04230 (August 2003)

RESERVE SUPPORT TEAM GUIDE SPECIFICATIONS

SECTION 04230

CALCIUM SILICATE MASONRY UNITS 08/03

NOTE: This guide specification covers the
requirements for Calcium Silicate Masonry Units.

PART 1 GENERAL

1.1 REFERENCES

NOTE: Issue (date) of references included in
project specifications need not be more current than
provided by the latest change to the guide
specification.

RST-04720R is a Louisville District Army Reserve
Support Team (RST) specification. Refer all
specification comments to the RST.

The listed references should not be manually edited
except to add new references. References not used
in the text will be deleted from this paragraph
during the SpecsIntact reference reconciliation
process.

The publications listed below form a part of this specification to the
extent referenced. The publications are referred to within the text by the
basic designation only.

ACI INTERNATIONAL (ACI)

ACI 530	(1999) Building Code Requirements for Masonry Structures
ACI 530.1	(1999) Specifications for Masonry Structures

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 82	(1997a) Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A 153	(1998) Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A 508	(95-1999) Standard Specification for Quenched and Tempered Vacuum-Treated Carbon and Alloy Steel Forgings for Pressure Vessels
ASTM A 508	(1998) Standard Specification for Stainless Steel Wire
ASTM C 67	(2002a) Test Methods for Sampling and Testing Brick and Structural Clay Tile
ASTM C 73	(1997a) Standard Specification for Calcium Silicate Face Brick
ASTM C 97	(2002) Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C 99	(87-2002) Test Method for Modulus of Rupture of Dimension Stone
ASTM C 144	(1999) Standard Specification for Aggregate for Masonry Mortar
ASTM C 150	(1998) Standard Specification for Portland Cement
ASTM C 170	(90-1999) Test Method for Compressive Strength of Dimension Stone
ASTM C 207	(1997) Standard Specification for Hydrated Lime for Masonry Purposes
ASTM C 270	1999) Standard Specification for Mortar

for Unit Masonry

ASTM C 780

(2000) Test Method for Preconstruction and
Construction Evaluation of Mortars for
Plain and Reinforced Unit Masonry

INTERNATIONAL MASONRY INSTITUTE ALL-WEATHER COUNCIL
(IMIAWC)

IMIAWC

Recommended Practices and Guide
Specifications for Cold Weather Masonry
Construction

MASONRY ADVISORY COUNCIL (MAC)

MAC

Hot and Cold Weather Construction

1.2 SECTION INCLUDES

Scope - All labor, materials and equipment to provide the calcium silicate masonry units shown on architectural drawings and as described in this specification.

1. Manufacturer shall furnish calcium silicate masonry units, mortar for unit masonry, and all reinforcement, anchorages, and accessories covered by this specification.
2. Installing contractor shall unload, store, set, patch, and clean all calcium silicate masonry units.

1.3 RELATED SECTIONS

Section 01330 Submittals
Section 04200 Unit Masonry
Section 07900 Joint Sealers

1.4 DEFINITIONS

Calcium Silicate Masonry Units - Manufactured calcium silicate masonry units contain no portland cement. They are pressure formed and autoclave cured resulting in high-density, severe weathering modular masonry units, with one or more finished faces. They may be site cut, trimmed and finished to custom lengths, shapes or sizes, as necessitated by site conditions.

1.5 SUBMITTALS

NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

Place a "G" within submittal tags following a submittal item if Government approval for that item is required. Government approval should be required only for items deemed sufficiently critical, complex, or aesthetically significant to merit such action.

For submittals requiring Government approval, a code of up to three characters within submittal tags may be used following the "G" designation to indicate the approving authority.

Submittal items not designated with a "G" are considered as being for information only.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

Acceptable Manufacturer Products;

Manufacturers products listed in this specification are referenced to establish a standard of quality. When the specific product listed is submitted by the Contractor, that submittal will be considered For Information Only. When an equal to that named in this specification is submitted, it shall be for Government Approval (G). The following manufacturer products are specifically mentioned in this specification:

Arriscraft International	Arriscraft Cream
P. O. Box 3190	Smooth Texture
875 Speedsville Road	
Cambridge, Ontario, Canada N3h 4S8	
519 653 3275	
www.arriscraft.com	

Manufacturer Product submitted as an "or equal"; **G, ED**

SD-01 Preconstruction Submittal

Manufacturer's Qualifications; **G, ED**

SD-02 Shop Drawings

Manufacturer's Shop Drawings; **G, ED**

Submit manufacturer's shop drawings including profiles, cross section, reinforcement, exposed faces, arrangement of joints , anchoring methods, anchors (if required), annotation of masonry types and their location.

SD-03 Product Data

Manufacturers catalogue cuts; **G, ED**

SD-04 Samples

Calcium Silicate Masonry Units; **G, ED**

Submit pieces of the masonry that are representative of the general range of finish and color proposed to be furnished for the project.

SD-6 Test Reports

Calcium Silicate Masonry Units;

Submit manufacturer's test results of Calcium Silicate Masonry Units previously made by the manufacturer

1.6 QUALITY ASSURANCE

1.6.1 Installer Qualifications

Installer shall have 3 years experience handling and installing calcium silicate masonry units and shall be an approved installer by the material manufacturer. The Installer shall follow ACI 530 and ACI 530.1 requirements.

1.6.2 Standards

Comply with the requirements of the International Masonry Institute All-Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction, the Masonry Advisory Council: Hot and Cold Weather Construction, and the project specifications. Where a conflict may occur, the contract documents shall prevail.

1.6.3 Mock-up

Provide full size unit(s) for use in construction of sample wall. The approved mock-up shall become the standard for appearance and workmanship for the project. The wall shall be of sufficient size to illustrate masonry units, coursing, mortar joints, and movement control joints, cavity wall, insulation, connectors, weep holes, and through wall flashing. Combine the requirements of this paragraph with those of Section 04200, MASONRY, Paragraph 1.3 SAMPLE MASONRY PANELS.

1.6.4 Delivery, Storage, and Handling

Deliver mortar materials in original unbroken and undamaged packages with the maker's name and brand distinctly marked thereon, and upon delivery store under a protected area until used on the work. Deliver masonry units to the site in approved protective film. Prevent damage to units. Stack

masonry units on timbers or platforms at least three (3") inches above grade. Place polyethylene or other plastic film between wood and other finished surfaces of units when stored for extended periods of time. Do not use salt or calcium-chloride to remove ice from masonry surfaces.

1.6.5 Environmental Requirements

Maintain materials and surrounding air temperature to minimum 52 degrees F prior to and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1 CALCIUM SILICATE MASONRY UNITS

Calcium Silicate Masonry Units shall be manufactured to ASTM C 73 specifications, Grade SW, solid units having been pressure formed and autoclaved, with 3-5/8 inch bed depth, and modular sizes as indicated on the drawings, smooth textured on exposed faces and ends, cream color, having the following typical average properties when tested to the identified standard.

2.1.1 Physical Properties

Calcium Silicate Masonry Units shall have the following properties:

1. Compressive Strength - ASTM C 67: 8,500 psi (59 Mpa)
2. Compressive Strength - ASTM C 170: 6,600 psi (45.5 Mpa)
3. Absorption - ASTM C 97: 8.8 percent
4. Density - ASTM C 97: 129 lb/ft³ (2070 kg/m³)
5. Modulus of Rupture - ASTM C 99: 770 psi (5.3 Mpa)

2.2 MORTAR MATERIALS

- A. Portland cement - Type I , white , ASTM C 150.
- B. Hydrated Lime - ASTM C 207, Type S.
- C. Mortar Aggregate - White Silica Type; clean, dry, protected against dampness, freezing, and foreign matter, ASTM C 144.
- D. Color Pigment - Natural oxide pigment, Flamingo C-380.
- E. Water - Potable, clean and free of deleterious amounts of acids, alkalies or organic materials.

2.4 REINFORCEMENT AND ANCHORAGES

- A. Bed Joint Reinforcement - Single-wire type; 0.186"; stainless steel, to ASTM A580.
- B. Anchors - as recommended by the Calcium Silicate Masonry Unit manufacturer.
- C. Wall Ties - as recommended by the Calcium Silicate Masonry Unit manufacturer. 300 mm
- D. Pintle Ties - as specified in Section 04200, MASONRY, Paragraph 2.11 ANCHORS, TIES, AND BAR POSITIONERS.

2.5 MASONRY FLASHING

- A. 21 degrees CFlexible Flashing - Coordinate with Section 04200, MASONRY, Paragraph 2.17 FLASHING

2.6 ACCESSORIES

- A. 3 mmWeep Hole Ventilators - Coordinate with Section 04200, MASONRY, Paragraph 2.18 WEEP HOLE VENTILATORS

2.7 MORTAR MIXES

- A. 3 mmMortar for Calcium Silicate Masonry Units - ASTM C 270, Proportion specification, 1 part Portland cement, 1/2 part hydrated lime, 4-1/2 parts mortar aggregate by volume for both cementitious materials and aggregate; integral color, Flamingo C-380.

2.8 MORTAR MIXING

- A. 3 mmThoroughly mix mortar ingredients in proper quantities needed for immediate use to requirements of ASTM C 270.
- B. Add mortar color, Flamingo C-380, and admixtures to requirements of manufacturer's instructions.
- C. Provide uniformity of mix and coloration.
- D. Take representative samples for testing consistency of strength and color according to ASTM C 780.
- E. Use mortar within 2 hours after mixing at temperatures of 84 degrees F, or 2-1/2 hours at temperatures under 52 degrees F.

2.7 FINISHES

A. Hot Dip Galvanizing - ASTM A 153, Class B2

B. Stainless Steel - ASTM A 508, Type 302

2.8 FABRICATION TOLERANCES

A. Fabricate calcium silicate masonry units to the following tolerances:

1. Unit Length: Plus or minus 1/16-inch
2. Unit Height: Plus or minus 1/16-inch
3. Bed Depth: Plus or minus 1/8-inch
4. Custom Dimensions: Plus or minus 1/8-inch
5. Unit Face Deviations: Plus or minus 3/8-inch
6. Deviation From Square: Plus or minus 1/16-inch, with measurement taken using the longest edge as the base.

PART 3 EXECUTION

3.1 EXAMINATION

Installing Contractor shall check the Calcium Silicate Masonry Units for fit and finish prior to installation. Verify that site conditions are ready to receive work. Beginning of installation means acceptance of site conditions. Do not set unacceptable units.

3.2 PREPARATION

Direct the correct placement of metal anchors and verify items provided by others sections of work are properly sized and located.

3.3 CUTTING OF MASONRY UNITS

Pre-soak units using clean water prior to cutting. Cut masonry units with wet-saw. Clean cut units using a stiff fibre brush and clean water. Allow units to surface dry prior to placement.

3.4 COURSING

Place masonry to lines and levels indicated. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness. Lay masonry units in half-running bond. Course one masonry unit and one mortar joint to equal 8-inches. Maintain mortar joint

thickness of 3/8-inches. Tool joints to a concave finish.

3.5 PLACING AND BONDING

Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted. Fully bond intersections and external corners. Isolate masonry partitions from vertical structural framing members with a control joint. Do not adjust masonry units after laying. Where resetting of masonry is required, remove, clean units and reset in new mortar.

3.6 CAVITY WALL

Install weep hole ventilators in veneer 24-inches on center horizontally above through-wall flashing, shelf angles, and at bottom of walls. Install cavity vents at top of cavity space at same spacing.

3.7 TOLERANCES

A. Variation in alignment from unit to adjacent unit: 1/16-inch maximum.

B. Variation of mortar joint thickness: 1/8-inch every 36-inches.

3.8 REINFORCEMENT AND ANCHORAGES

Place bed joint reinforcement and seismic clips in mortar beds, spaced not greater than 16-inches on center vertically. Embed wall ties in masonry back-up for veneer at maximum 16-inches on centers vertically and 24-inches on centers horizontally. Increase quantity of wall ties around perimeter of openings, at wall terminations and corners, placed within 8-inches of openings and edges of masonry.

3.9 MASONRY FLASHING

Extend flashing through veneer, turn up and bed into mortar joint of masonry back-up. Lap end joints and seal watertight.

3.10 LINTELS

Install loose steel or precast concrete lintels as scheduled.

3.11 MOVEMENT CONTROL JOINTS

Construct movement joints in locations noted on drawings. Do not continue horizontal joint reinforcing across movement control joint. Form movement control joints by leaving head joints between stacked units void of mortar, ready for application of bond breaker and joint sealant. Size joint in accordance with Section 07900, JOINT SEALER, for sealant performance.

3.12 CLEANING

A. Clean masonry as work progresses. Allow mortar droppings on masonry to partially dry then remove by means of brushing with a stiff fibre brush.

B. Post-Construction: Clean mock-up panel as directed below and leave for one week. If no harmful effects appear, and after mortar has set and cured, clean masonry as follows:

1. Protect windows, sills, doors, trim and other work from damage.
2. Remove large particles with stiff fibre brushes without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
3. Scrub with solution of 1 teaspoon trisodium phosphate and 1 teaspoon household detergent dissolved in 4 cups of clean water using stiff fibre brushes, then clean off immediately with clean water using hose.
4. Repeat cleaning process as often as necessary to remove mortar and other stains.

C. Use alternative cleaning solutions and methods for difficult to clean masonry only after consultation with masonry unit manufacturer.

3.13 PROTECTION

Protect masonry units from damage resulting from subsequent construction operations. Use protection materials and methods which will not stain or damage masonry units. Remove protection materials upon Substantial Performance of the Work, or when risk of damage is no longer present.

-- End of Section --